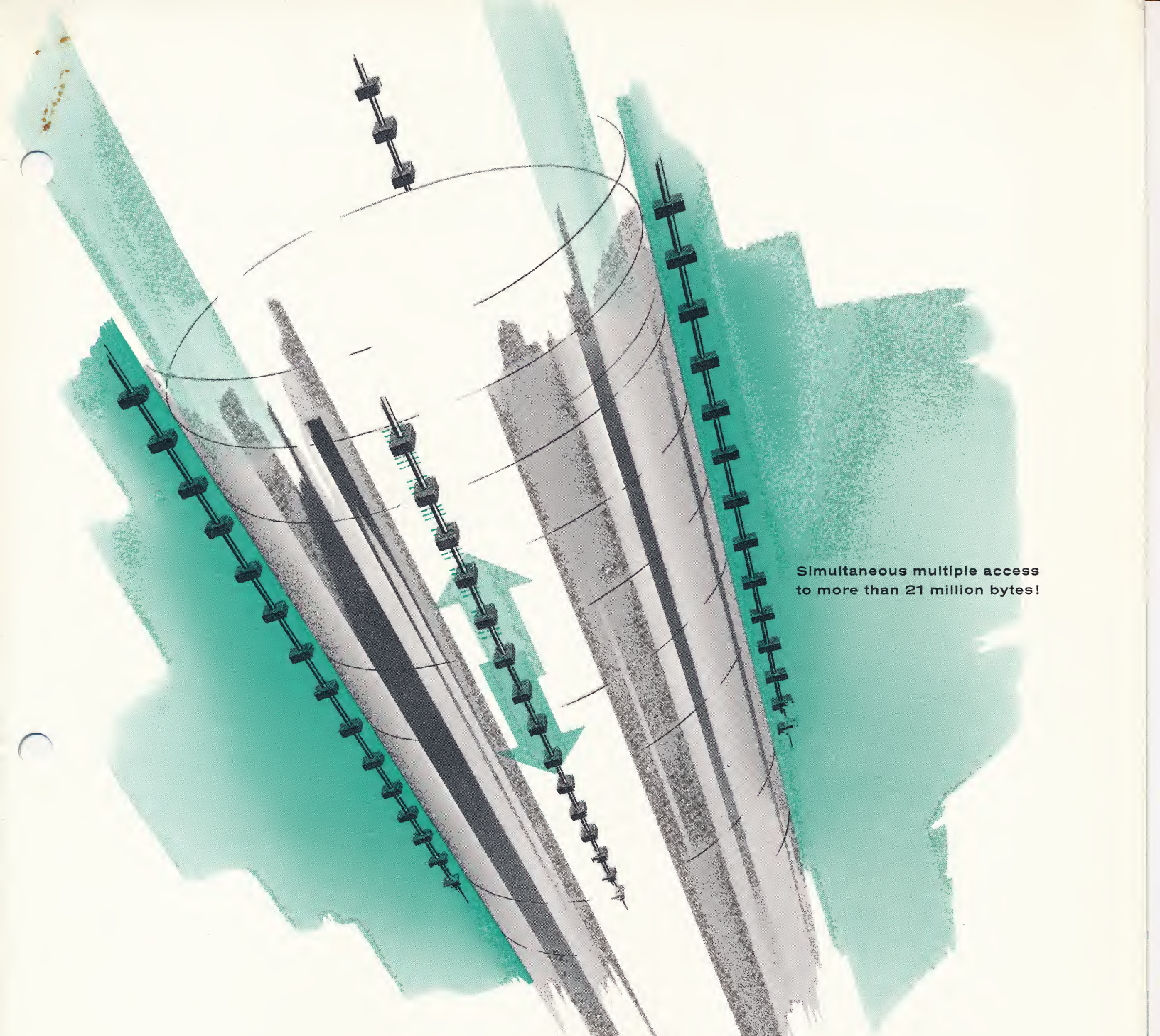




Simultaneous multiple access
to more than 21 million bytes!

BRYANT **PhD-170**
RANDOM ACCESS MASS MEMORY

BRYANT

PhD-170: the first mass simultaneous multiple access to its entire

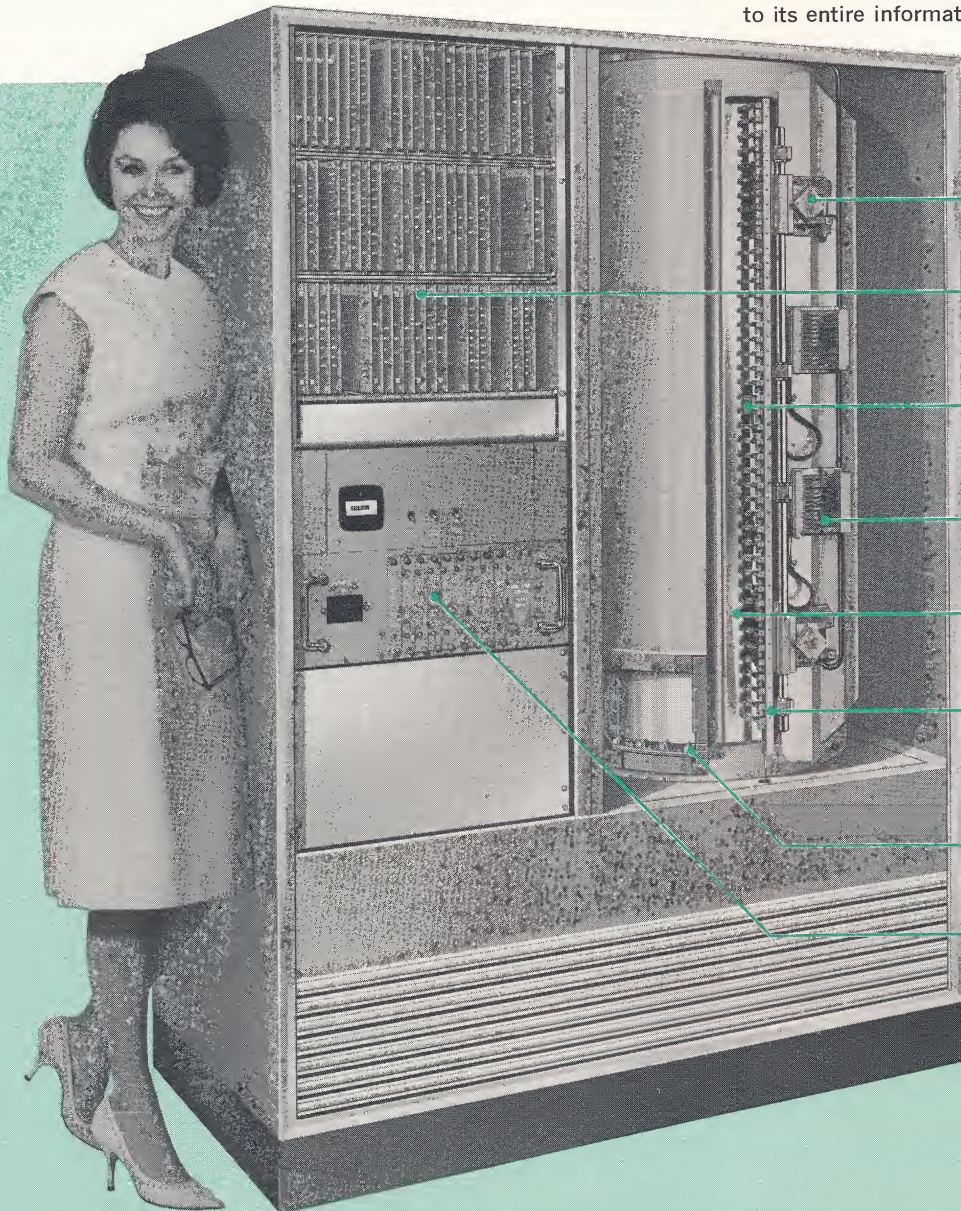
VISUALIZE, if you will, a cylindrical drum upon whose surface over 170 million bits of data can be magnetically recorded in 2752 separate tracks. Mounted vertically around this drum are one, two, three, or four groups of independently positionable write/read heads — up to 43 per group — arranged so that the corresponding heads in each system can gain access to the same data stored in any one of 64 assigned tracks at the same time.

This, briefly, is the Bryant PhD-170—a new breed of random access mass memory so unique in concept, so inherently reliable and versatile in operation that it can readily be used for a whole new range of advanced on-line applications. Examples: As a massive information storage and retrieval system for inventory control, banking, stock market trans-

actions, actuarial calculations, directory references — airline reservations and telephone switching systems — buffer storage for scientific and edp computers, process controllers, and data communication terminals, just to mention a few.

For, unlike previous true mass memories, the Bryant PhD-170 is not limited to writing in or reading out only a small portion of its total data storage capacity at any given time. Nor is its remarkable accessing capability dependent upon the use of an excessive number of costly heads and/or elaborate multiplexing selection and write/read circuitry.

Instead, this simple new mass memory requires only 43 discretely positionable heads to serve all of its 2752 tracks. And, if equipped with two or more such write/read systems, it actually provides independent simultaneous multiple access to its entire information store of up to 172,825,600 bits!



"Safe-Set" Head Interlock—A simple automatic fail-safe actuating device that assures non-contact start/stop operation.

Electronic Interface—Write, read, head select, and logic electronic circuit modules available in standard or special systems designed to meet your specific needs.

Read/Write Heads—All heads are high density aerodynamic "flying" Uni-Just® units proved in use by years of reliable service in many Bryant Auto-Life Drums.

Signal Preamplifiers—Provide a gain factor of approximately 5 to the playback values fed to the read amplifiers.

Magnetic Storage Drum—Smooth, hard plated surface is special high density, high reliability magnetic recording material.

Positionable Head Bar—Up to four access systems with up to 43 heads each can either be used to address the same information simultaneously or up to four different data stores independently.

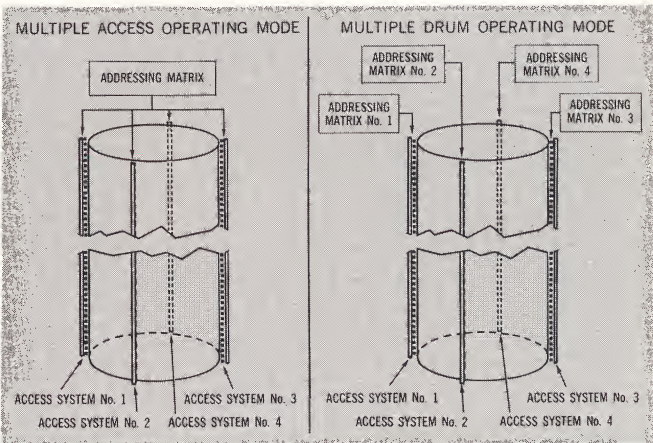
Fast Access Heads—Non-positionable units provided to serve various fast access data, register, or clock functions.

Address Preamplifier—Standard unit provides customer address signal amplification for two positionable access systems.

memory capable of providing independent information store—over 170 million bits!

Operating Modes—As shown at right, a Bryant PhD-170 having more than one access system offers exceptional programming flexibility. In the Multiple Access operating mode, all 43 heads in each access system can be addressed through one matrix and all can write/read over the entire recording surface of the drum. If operated in the Multiple Drum mode, 10 heads in each access system can be addressed through separate matrices at different frequencies to write/read on 640 tracks. In both modes, the PhD-170 can serve several computer and/or data processing installations at the same time.

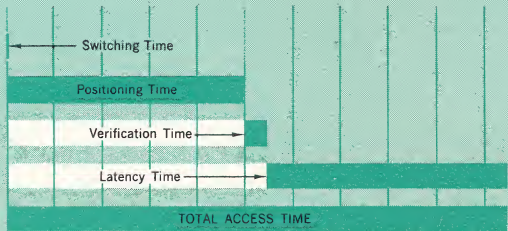
Transaction Rates—Very high transaction rates can also be achieved with the PhD-170. For example, using a 2000-byte message length, a 1200-rpm/two-access drum memory can be multiplexed to perform nearly 200,000 transactions per hour. Four access systems would allow the drum to service two processors at this same rate.



CHARACTERISTICS OF BRYANT PhD-170 RANDOM ACCESS MASS MEMORY

PARAMETER	SPECIFICATIONS	PARAMETER	SPECIFICATIONS	PARAMETER	SPECIFICATIONS
Drum length	43 inches	Data Storage Capacities:		Recording mode	Self-clocked, phase modulated
Drum diameter	20 inches	General data—per track	62,800 bits, or 7,850 bytes ⁽³⁾	Pulse repetition rate (nominal)	1.2 megacycles
Drum speed (nominal)	1200 (or 1800) rpm	—per drum	172,825,600 bits, or 21,603,200 bytes	Pulse density	1000 bits per inch
Drum surface speed	1250" per second	Fast-access data, register or clock—per track	62,800 bits, or 7,850 bytes	Playback (from preamplifiers)	75 millivolts (avg.)
Time to reach operating speed	5 minutes	—per drum	1,004,800 bits, or 125,600 bytes	Power requirements	208-volt, 3-phase, 60-cycles
Data tracks (maximum)	2752 ⁽¹⁾	Data heads—per positioner	43 max.	Power demand per phase—start	9.7 kilowatts
Fast-access data, register or clock tracks	16 ⁽²⁾	—per drum	172 max.	—run	5.1 kilowatts
Track width	0.010 inch	Fast-access data, register or clock heads—per drum	16 ⁽²⁾	Current demand per phase—start	27 amperes
Track-to-track spacing	0.015 inch	Inductance—for half coil at 140 Kc	10 (±1) microhenry	—run	14 amperes
NOTES (1) With the maximum capacity configuration, a total of 16 tracks are available for fast-access data, register and clock functions. (2) To provide a large fast-access capacity in conjunction with general storage, one fast-access data, register and clock track can be added to the drum for each three general storage tracks removed. (3) Values shown based on 8 bits per byte.		Resonant frequency (nominal)	7.0 megacycles	Ambient temperature range—non-operating	−30° to +130°F
		Termination impedance	1 kilohm	—operating	60° to 90°F
				Ambient humidity range—operating	10 to 80% relative

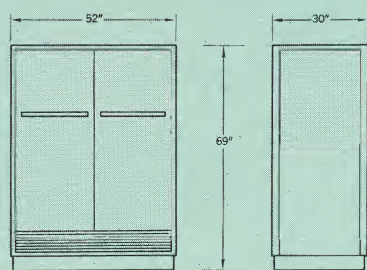
Diagram Breaking Down Total Access Time



	BEST CASE Sequential, Track to Track	WORST CASE Full Stroke, Track 0 to 63 or 63 to 0
Switching Time	μs	μs
Positioning Time	25ms	50ms
Verification Time	5ms	5ms
Latency Time	0ms	50ms
TOTAL ACCESS TIME	30ms	105ms

Times shown above are based on use of 43 data heads and one head positioning system. Positioning time includes time to energize solenoid valve plus time for motion and settling. Access time for fast-access data heads is μs to 50ms.

Physical Specifications/Dimensions and Weight



Total weight, installed—1500 pounds.



Every part and every component—whether newly developed or thoroughly established by successful prior use—must be approved by this Design Review Committee before it can be incorporated in new Bryant products.

Departments represented on the Committee include those responsible for product design, reliability engineering, value analysis, manufacturing, application engineering and customer field service functions.

"Total Product Assurance" Concept is the Key to Bryant Quality

One reason why Bryant has become the world's leading independent producer of memory drums and disc files is its concept of "total product assurance." For when you buy Bryant equipment, you can be sure that: 1) Its design is based upon proven principles of operation and performance. 2) Every outside purchased component is the very finest obtainable. 3) Every precision part and assembly is controlled to the highest known standard of accuracy and quality. And 4) every finished product has been subjected to thorough computer-simulated testing prior to shipment to assure the ultimate in value and reliability.

Other Bryant customer services include complete installation of equipment by qualified factory engineers, a special training school for instruction of your personnel, and an inventory of spare parts—many having assigned federal stock numbers—to assure prompt field replacements when necessary.

BRYANT COMPUTER PRODUCTS

A Division of EX-CELL-O Corporation

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